Amendments to the Specification:

Please replace the paragraph beginning at page 2, line 4 with the following amended paragraph:

Therefore, back-side illuminated photodiode arrays are frequently used in many imaging applications to improve the photosensitivity and the imaging resolution. In a typical back-side illuminated photodiode array, a transparent conductive anti-reflection layer such as indium tin oxide ("ITO") is formed over a heavily-doped layer which constitutes the bias electrode layer. See, e.g., Holland et al., "Development of low noise, back-side illuminated silicon photodiode arrays," IEEE Transactions on Nuclear Science, Vol. 44, No. 3, June 1997 and Kwa et al., "Backside-illuminated silicon photodiode array for an integrated spectrometer," IEEE Transactions on Electron Devices, Vol. 44, No. 5, May 1997.

Please replace the paragraph beginning at page 4, line 1 with the following amended paragraph:

FIG. 1 shows an improved back-side illuminated photodiode array 100 according to one embodiment of the invention. A semiconductor substrate 102 may be lightly doped to exhibit the n-type conductivity (or alternatively, the p-type conductivity)

and have a high resistivity. For example, silicon may be used to form the substrate 102 with a resistivity on the order of about 1 Ω□cm[[1]]. One side of the substrate 102, the "front" side, is selectively doped at different locations to form an array of heavily p-doped regions 104 that are separated from one another. A p-n junction is formed by each region [[102]] 104 and the surrounding n-region of the substrate 102 and functions as a photosensitive element (i.e., a photodiode) to detect photons within a spectral range. A circuit layer 110 is ~~next~~ formed over the front side of the substrate 102 and provides gates and readout circuits to the photodiodes. The opposing side of the substrate 102, i.e., the "back side", is heavily n-doped to form a conducting polysilicon layer 106 as a bias electrode layer[[2]].

Please replace the paragraph beginning at page 6, line 1 with the following amended paragraph:

Many imaging applications require detection of radiation in a spectral range that is out of the spectral response range of the

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[1] ~~What's the typical resistance range of the substrate for this type of detectors?~~

[2] ~~Can this be a transparent conducting layer rather than the conducting polysilicon?~~

photodiode array. Conventionally, a scintillation crystal is placed in front of a photodiode array to covert the radiation into a different radiation that is detectable by the photodiode array. Impurities and certain defects in many commercial scintillation crystals can cause scattering of radiation and hence may lead to cross talk of adjacent photodiodes[[[3]]]. Such cross talk[[s]] can lead to adverse smearing of an input image.

[3] ~~Is this correct? Or the cross talk is caused by the angled input rays?~~